

Oxus as far as it flows parallel with the Hindu Kush; then cross over the pass of Ishkashm to the Upper Kokcha from which in all probability the Anderab valley is accessible, and also Bamian. From Bamian Capt. Conolly passed to the upper waters of the river of Balkh and thence into the valley of Hari Rud, which expands westward to the meridian of Herat.

Between the meridian of Herat and Kabul, at least three lines of lateral communication are partially delineated. These are the parallel valleys of the Hari Rud, of the Murghab, and of the route traversed by Vambery, and the Russian officer Grodekov. Indeed it can be still further demonstrated that practical lateral communication exists throughout the whole length of the Iranian and Himalayan systems, and probably offers greater facilities of transit than the transverse routes.

On this point a few words appear to be called for, by the statements of a recent writer, a member of parliament, and formerly an Indian Governor of great distinction, who has denied the existence of lateral communication along and within the Suliman Mountains which form the easternmost part of the Iranian system and extend nearly from the Kabul River to the sea.

So far from lateral communication being wanting in this locality, which is now of much importance on account of its being brought by treaty within the scope of British administration—so far from the lateral communication being deficient and much less altogether absent—it constitutes as in the other mountains which we have discussed, a characteristic and marked feature of them. Indeed the outermost slope or scarp of the eastern Suliman has been delineated like a rising series of parallel gutters, terraces, or troughs, in the beautiful maps of the Derajat prepared by the surveyors under the guidance of Major-General Sir Henry Thüillier, who for so long a time filled the office of Surveyor-General of India, and whose presence here is such an advantage to the section.

In the heart of the mountains two lines of lateral communication can be already traced, even with our present very scanty information. Both are on the east of the waterparting of the Helmund and Indus basins, which is formed by the western range of the Suliman. One skirts the very summits of the range and is formed at its northern limit by the uppermost valleys of the Kurram, west of the Peiwar Kotul. It is watered by a stream which descends from near the Shutargarden Pass to the Kurram, where it meets another branch of the Kurram coming from the Mangal country on the south-western limits of the Kurram basin. From thence there is a communication with the district of Furmul which was known to the Turki Emperor, geographer, and conqueror of India—the famous Baber. Furmul lies at the head of the Dawar valley and river, which descends from it straightway to the Indus, but has never yet been wholly traversed by Europeans. Furmul is occupied by the Karoti tribe of the famous Povindah merchants, unless the Waziri have driven them out.

From Furmul this lateral line passes on to the Dwa Gummul another haunt of the Karoti people, who, as Povindahs and periodical visitors and traders to India, should have a clear interest in being friendly with us. From the Dwa Gummul we pass on to a southern headwater of the Gummul, and so on to the head of the Zhob valley, which is connected with the Thal-Chotiali route to Peshin.

There is another very important lateral line, a part of which was made known to Lieut. Broadfoot of the Royal Engineers as far back as 1842, by a native name, signifying "the road of the Waziri," a dominant tribe in those parts. This also connects the Kurram valley with the Dawar and Gummul valleys; and it is prolonged from Gummul up to the Chotiali route, by the great Zhob valley, which has at least been distinctly seen from both ends, in a direction nearly meridional. We all know the great road which has been traversed by British troops between Kabul, Ghazni, Kandahar, and Kelat, and eastward of this, on the western side of the western Suliman range, a route has been traversed from Zurmul to lake Abistada, and from the lake to Kelat, British troops have marched over the Toba highland.

So much by way of proof of abundant lateral communication along the mountains west of the Indus.

One word more relating to the lateral communication through the hills and valleys of the south slope of the great Iranian highland. For it relates to the construction in the near future of a railway to India. From sheer ignorance some have proposed to carry such a line along the coast in a deadly climate with the atmosphere of a permanent hot bath. But the true route is found in one of those elongated lateral valleys which at

a considerable elevation above the sea and in a better climate than that of the lowland on the coast, stretch all along from the Pubb river on the borders of India to Mesopotamia. Among these is the line of the Kej valley and a succession of others leading to Shiraz, from whence there is little doubt that a practical line may be found up to Bagdad.

#### UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—The Professorship of Experimental Physics has been formally continued by the Senate, and there is now no doubt that if Lord Rayleigh is willing to undertake this onerous office, he will be elected Professor. A memorial requesting him to be a candidate signed by almost every elector in a very short time seems like a command. It shows that there is no fear, and every hope for a beneficial result to education following. Lord Rayleigh's knowledge of the working of the University and the Scientific Commission will give him a most commanding position. It is a clear "call" from the University when such men as Adams, Besant, Cayley, Dewar, Ferrers, Frost, Garnett, J. W. Glashier, Hughes, Liveing, R. K. Miller, Peile, Pendlebury, Routh, Salvin, Skeat, Stoke, James Stuart, Todhunter, Venn, James Ward, W. Aldis Wright and others unanimously record their view that it would tend greatly to the advance of physical science and to the advantage of the University that Lord Rayleigh should occupy the chair of Experimental Physics at Cambridge.

Messrs. C. W. Moule (Corpus) and S. H. Vines (Christ's) have been appointed members of the Botanic Garden Syndicate till November 20, 1882; Drs. Power and Phear have been appointed on the Museum and Lecture Rooms Syndicate; Mr. Henry Sedgwick and Mr. V. H. Stanton are again on the Local Examinations Syndicate; Messrs. W. D. Niven and G. H. Darwin are appointed on the Observatory Syndicate; Messrs. Bradshaw, Bensly and Peile, and Dr. Hart and Mr. Aldis Wright are on the University Press Syndicate; the two latter are special elections in view of the publication of the Revised Translation of the Bible; P. T. Main and F. M. Balfour on the State Medicine Syndicate.

Mr. S. H. Vines is also appointed on the Natural Science Studies; and Dr. Paget has been elected on the Council of the Senate, as a Professor, in Prof. Maxwell's place, for one year, and by only one vote over Prof. Stuart. Dr. Paget has on previous occasions been unwilling to come forward for such an onerous post, and would hardly now have done so, but for the short term of office required, and the importance of the medical and natural science rearrangements at Cambridge demanding his aid if the University showed its confidence in him.

An amended schedule for 2nd M.B. Camb. to come into operation in June, 1880, as far as regards comparative anatomy differs from that at present in force in introducing *excretory* and *reproductive* organs, as being required to be known in addition to the other principal systems: the tapeworms parasitic in man, cockroach, fresh-water mussel, whiting, and rabbit are introduced, while the spider and the cockchafer, oyster, perch, and rat disappear. In the specification as to the vertebrate skeleton, the cod displaces the perch, the dog replaces the rat. These changes all seem to be in the direction of providing larger and more conspicuous and accessible specimens to be studied, or those more necessary for a medical student.

#### SCIENTIFIC SERIALS

*Journal of Botany*, September, October, and November.—The last three numbers of this journal are mainly occupied with articles on descriptive and systematic botany, extracts, and reviews, with the exception of two, to which special attention may be called.—In the September number Mr. S. Le M. Moore has a "preliminary notice" on mimicry of seeds and fruits, and the functions of seminal appendages. He points out the number of seeds or fruits that bear a striking resemblance to coleopterous or other insects, by means of which he believes they may often escape from their semivorous enemies by being passed over as insects, or, being picked up and thrown away by insectivorous birds, may thus become disseminated. He adduces striking instances of this mimicry in Polygalaceæ, Leguminosæ, Umbelliferae, and especially Euphorbiaceæ, in which the carunculus of the seed closely resembles the head of the insect, and the raphal

line the line between the closed clytra, the seed being often besides symmetrically striped or spotted. The main object of the fleshy carunculus has been generally assumed to be the supplying of food to the young embryo; but this, Mr. Moore believes, is not confirmed by actual experiment. It also no doubt serves to attract seminivorous birds, through whose body the seed passes to be prepared for germination.—In the November number Mr. S. H. Vines has an article on alternation of generations in Thallophytes, the main object of which, however, is to show that it does not exist, except in a very few cases. This is indeed in accordance with the general view of botanists. Mr. Vines still holds to his view that alternation of generations occurs in Characeæ; though why he now returns to the very doubtful position which he had previously abandoned, that the Characeæ are Thallophytes, is not explained.

*Nuovo Giornale Botanico Italiano*, October.—Sig. Borzi continues his series of papers on the morphology and biology of the Phycochromaceæ, the present portion being devoted to the structure and classification of the Scytonemaceæ, which he makes to consist of seven genera, viz., Coleodesmium, Bzl.; Tolypothrix, Ktz.; Hilsea, Kirchn.; Scytonema, Ktz.; Stigonema, Ag.; Capsosira, Ktz.; and Hapalosiphon, Nag. The various modes of increase he defines to be (1) by pseudoramuli, or portions of filaments which deviate from the ordinary direction, heterocysts being sometimes interposed between these and the filament from which they spring; (2) by spontaneous fraction of the filaments, the different portions remaining united in a bundle within a common gelatinous envelope, where they increase independently; (3) by hormogonia, or fragments which become detached from the filament, and which move slowly in the water in a rectilinear direction, light exercising no influence on the movement; (4) by spores, or isolated cells capable of resisting cold and excessive drought. In the same number A. Bertolini describes a new disease of the cherry-laurel, caused by a parasitic fungus, to which he gives the name *Oidium passerinii*, and which attacks the fruit. It makes its appearance in the form of irregular white spots, composed of filaments which invest the epicarp of the fruit, and from which rises a delicate down. The former is the mycelium of the fungus, the latter consists of the ovoid conidia arranged in moniliform filaments.

*THE Revue Internationale des Sciences* (September) contains the following among other papers:—The plant and man in their reciprocal relations, by Dr. Ernest Hallier.—On the geology of the Japanese Archipelago, by M. G. Maget.

#### SOCIETIES AND ACADEMIES

##### LONDON

Royal Society, November 20.—“On Definite Integrals involving Elliptic Functions.” By J. W. L. Glaisher, F.R.S.

“Values of the Theta and Zeta Functions for certain Values of the Argument.” By J. W. L. Glaisher, F.R.S.

“On Certain Definite Integrals.” No. 5. By W. H. L. Russell, F.R.S.

“On the Action of Nuclei in Producing the Sudden Solidification of Supersaturated Solutions of Glauber’s Salt.” By Charles Tomlinson, F.R.S.

“The Geometric Mean, in Vital and Social Statistics.” By Francis Galton, F.R.S., and Donald McAlister, B.A., B.Sc., Fellow of St. John’s College, Cambridge.

“On the Normal Paraffins. Part III.” By C. Schorlemmer, F.R.S., Professor of Organic Chemistry in Owens College, Manchester.

Zoological Society, November 18.—Prof. Flower, F.R.S., president, in the chair.—An extract was read from a letter addressed to the Secretary by Mr. H. O. Forbes, on the subject of the distribution of the badger-headed *Mydaus* in Java.—The Secretary read an extract from a letter received from Dr. A. B. Meyer, in which the habitat of *Cervus alfredi* was stated to be Samoa and Leyte Islands, of the Philippine group.—Mr. Edward R. Alston exhibited some mammals collected by Mr. Wardlaw Ramsay, 67th Regiment, including examples of some species new to the faunas of Burma and Afghanistan.—Mr. Alston also exhibited one of the typical skulls of *Tapirus dovi* (Gill), which had been entrusted to him by the authorities of the U.S. National Museum. He remarked that the young tapir from Corinto, Nicaragua, which was formerly alive in the Society’s Gardens, was really an example of *T. dovi*, and not, as had

been hitherto supposed, of *T. bairdi*.—Prof. Flower exhibited and made remarks upon the skull of a White Whale (*Delphinopterus leucas*), recently obtained in Sutherlandshire.—The Secretary exhibited on behalf of Mr. Rowland Ward, the head of a chamois, with two pairs of horns.—Communications were read from Mr. L. Taczanowski, C.M.Z.S., containing descriptions of a new *Synallaxis*, from Peru, which he proposed to name *Synallaxis fruticola*; and of a new *Myiarchus*, from the same country, proposed to be called *M. cephalotes*.—A third communication received from Mr. Taczanowski contained a notice of some birds of interest recently received from Turkestan.—A communication was read from Captain Shelley, containing an account of a collection of birds made in the Comoro Islands, received from Dr. Kirk, H.B.M. Consul-General at Zanzibar. The collection contained 186 specimens. A *Zosterops* which appeared to be new was named *Z. kirki*, in acknowledgment of the assistance rendered to ornithology by Dr. Kirk.—A second paper by Captain Shelley, gave the description of two new species of African birds.—Lieut.-Col. H. H. Godwin-Austen, F.Z.S., read a description of the female of *Lophophorus sclateri*, Jerdon, from Eastern Assam.—A communication was read from Dr. Goodacre, F.Z.S., on the question of the identity of the common and Chinese geese.—A communication was read from the Rev. O. P. Cambridge, C.M.Z.S., on some new and rare spiders from New Zealand; with characters of four new genera.—A communication was read on some African species of Lepidoptera, belonging to the sub-family, Nymphalinae, by Mr. W. L. Distant. In this paper several instances of great variation were given, and some corrections made in the nomenclature. A new genus, five new species, and the male of *Halma lucasi*, Down, were also described.—Mr. R. G. Wardlaw Ramsay read the description of a new oriole, from N. E. Borneo, which he proposed to call *Oriolus consobrinus*.

Royal Microscopical Society, November 12.—Dr. Beale, F.R.S., in the chair.—Ten new Fellows were elected and eleven proposed for election at the next meeting. Prof. Weismann and others were elected Hon. Fellows.—A paper by Mr. H. E. Forrest, on the anatomy of *Leptodora hyalina*, was read; also papers by Mr. J. Fullagar, on a supposed new species of freshwater *Freia*; by Col. Woodward, on amplifiers and the use of chloride of cadmium and glycerine as a fluid for homogeneous immersion, and by Mr. J. Mayall, jun., on his immersion stage illuminator, which was exhibited to the meeting. Among the objects exhibited were anomalous forms of *Acinetæ*, by Mr. Badcock, an improved micratoome, by Mr. Ward; various algae and infusoria, by Mr. Bolton, a new compressarium, by Mr. Graham, and Zeiss’s travelling-microscope, by Mr. Crisp.

Anthropological Institute, November 11.—E. B. Tylor, F.R.S., president, in the chair.—The following new Members were announced:—A. Tylor, F.G.S., Baron von Hugo, Capt. R. C. Temple, and G. W. Bloxam, F.L.S.—Mr. E. W. Brook, secretary to the Anthropometric Committee, exhibited two albums of photographs collected by that body.—A report on the Bheel tribes of the Vindhyan Range was read by Col. Kincaid, fully describing the manners, customs, and superstitions of these little-known people, from experience derived during many years’ residence amongst them. The Bheels are very dirty in their habits: their principal diseases are enlarged spleen and small-pox.—A paper was read by Mr. A. H. Keane on the relations of the Indo-Chinese and inter-oceanic races and languages, to show that Further India is occupied by two types, the fair and the yellow (Caucasian and Mongolian), the former speaking polysyllabic-untoned, the latter monosyllabic-toned, languages; that both of these types, intermingled with the Papuan or dark races, constitute the whole of the population of Malaysia; that the Caucasian alone appears in the Eastern Pacific as the “*Sauvatori*,” or “large brown Polynesian race.” The absence of the monosyllabic languages from the oceanic area was accounted for, the expression “Malayo-Polynesian” shown to be misguiding, and the Malay type itself was considered to be, not fundamental, but essentially mixed—the result of fusion in the Eastern Archipelago of the fair and yellow elements.—Mr. S. E. Feal exhibited a fine collection of ethnological drawings made in Assam.

##### VIENNA

Imperial Academy of Sciences, October 9.—The vice-president made reference to the deaths of Dr. Fenzl, of Vienna, and Dr. v. Brandt, of St. Petersburg.—The following among